

38CH1220 DATA RECOVERY MANAGEMENT SUMMARY, CHARLESTON COUNTY, SC



Chicora Research Contribution 553

38CH1220 Data Recovery Management Summary, Charleston County, SC

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CHICORA RESEARCH CONTRIBUTION 553



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ABSTRACT

This document provides a brief summary of data recovery excavations conducted by Chicora Foundation for Kiawah Partners of Charleston, SC at archaeological site 38CH1220, a Union Civil War encampment, under an existing Army Corps Memorandum of Agreement (MOA) and supplemented by an Office of Coastal Resource Management (OCRM) MOA approved on April 5, 2012. The work was based on a data recovery plan submitted by Chicora archaeologists and approved by the State Historic Preservation Office in 2011.

Previous archaeological investigations included a survey of a portion of the site in 1991, followed by additional testing in 2011. The data recovery plan was based on this 2011 work that revealed an area of denser remains, although almost no evidence of Civil War activity was identified. While historic research documented the presence of both Confederate and Union activities on Kiawah, no maps showing specific encampments appears to have been prepared. One map shows the Union picket line running down the Stono River, with only the eastern tip of Kiawah considered to be under Union control in 1863-1864.

Previous Civil War research suggests that camps tend to produce few materials recoverable using traditional archaeological survey or data recovery methods, for example, close interval shovel or auger testing, followed by block excavations. It has been argued that camps were "policed," removing the normal surface middens, concentrating artifacts in features such as privies and wells. Consequently, the preferred data recovery methods for Civil War camps have relied on wide-scale stripping in order to identify these specific features.

Such an approach was impossible at 38CH1220 which is situated in a nearly pristine maritime forest on beach dune and trough topography. The area is dominated by mature live oaks and stripping would irreparably harm the

vegetation and devalue the property. As a result, the SHPO approved the suggestion that the site be investigated by the use of ground penetrating radar (GPR), magnetometer, near surface metal detecting, and pedestrian survey. It was hoped that these techniques would identify features such as wells and privies, found to be distinctly shaped and often 3 feet or more in depth at other sites.

A series of three north-south and three east-west transects were established for the use of different explorative techniques. These areas were defined based on the assumption that the encampment was laid out using U.S. Army regulations.

Coupled with this approach was additional historical research with the goal to determine if any detailed information could be identified concerning Union encampments on Kiawah.

The historic research was conducted at the National Archives from February 14 through 19. The field work was conducted by Chicora archaeologists from March 25 through April 12, with GPR and magnetometer research provided by GEL Geophysics.

The historic research provided a broad range of general information to supplement that already identified for Kiawah, although no detailed accounts of Kiawah activities were identified.

The field investigations using near surface metal detecting identified over 200 targets, mostly ferrous items. The pedestrian survey identified a broad range of brick scatters across the site, as well as over a dozen areas of metal detecting looting. The magnetometer survey identified about 20 substantial metal objects, although all proved to represent individual items at or near the surface. No features were identified. The GPR work failed to identify any features – only broad geological deposits could be identified.

Since there were no features to investigate, two small test units were excavated in order to explore two of the brick piles. These excavations provided clues concerning the function of these brick piles and also a small quantity of artifacts associated with the piles.

The failure to identify features, specifically wells and privies, suggests that the posited regimental layout defined by Army regulations was not used at 38CH1220. Of course, it is possible that had broad areas been stripped, features would have been identified. It is also possible that wells and privies were located in areas of 38CH1220 that we could not investigate because of standing water and wetland delineation. During a period of reduced rainfall and posited lower sea levels, these trough areas may have been less wet than today. Nevertheless, these areas are not contiguous and do not fit the pattern proposed in Army regulations.

The presence of artifacts scattered across the site also suggests that military regulations regarding the policing of camps were not adhered to – a conclusion that seems to some degree supported by historic research.

Finally, it is clear that 38CH1220 has been heavily impacted by metal detector looters. The site was known to be heavily collected in the 1980s and our discoveries indicate that collecting continued at least into the period from about 2005 through 2011.

The data recovery plan, as proposed, as been followed and, in several areas, exceeded. We recommend no additional investigations, although there is always the potential for recovery of remains during construction.

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Introduction

Background

The data recovery investigations were conducted by Dr. Michael Trinkley of Chicora Foundation, Inc. for Mr. Ray Pantlik of Kiawah Partners in Charleston, South Carolina. The field studies were conducted from March 25 through April 12, 2013 with a crew of three archaeologists, plus the Principal Investigator (who was on-site throughout the project). A total of 444 person hours were spent in the field. An additional 8 person hours were spent in the field laboratory during rain periods. A broad range of detailed analysis is in the process of being conducted with the completion of the field investigations.

1991 Investigations

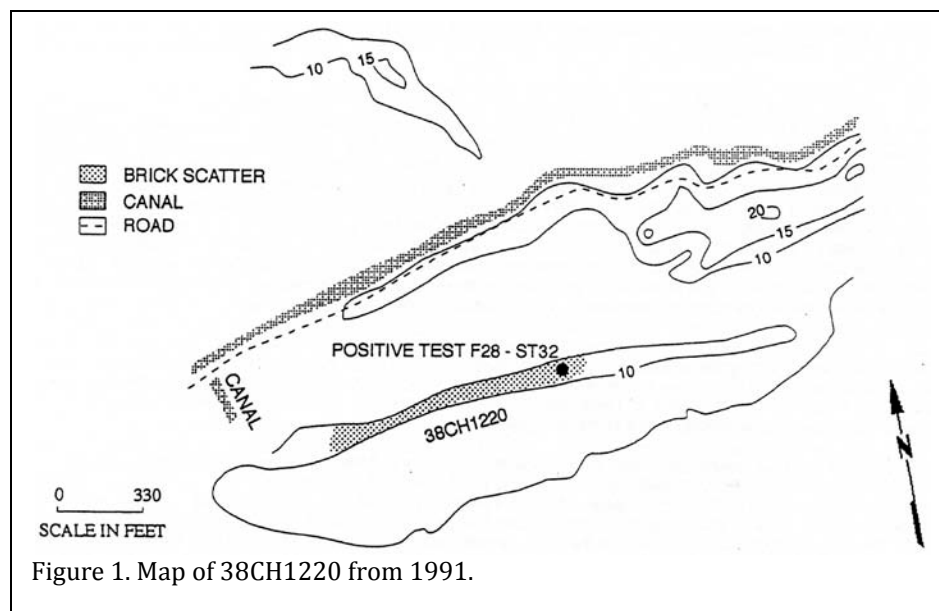
Site 38CH1220 was identified during investigations on Kiawah Island during February and March 1991. The SHPO Archaeologist, Dr.

Linda Stine, had previously determined high and low probability areas on the island. High probability areas were to be examined using shovel testing at 100 foot intervals on transects every 100 feet. Low probability areas were examined using pedestrian transects, also at 100 feet, with shovel tests placed judgmentally. The survey had use only of the published USGS topographic maps and an aerial photo. At that time GPS was not being used and site locations were based on transect information and placement on the topographic map.

The site was found during transect shovel testing on "the crest of the ridge" with dimensions of about 300 feet north-south by about 1000 feet east-west. It was best delineated by "approximately eight brick scatters" (Trinkley 1993:137). Shovel tests were unproductive, producing only one nail fragment. Surface collections, however, produced one iron axe head, 17 black bottle glass fragments, one blue bottle

glass fragment, one UID nail fragment, two UID spike fragments, one strap hinge, and 21 animal bones. During the survey, damage consistent with relic hunting using metal detectors was identified. Although seemingly minimal at any one location, the evidence was widespread, covering the entire identified area.

The SHPO requested that additional work, consisting of a metal



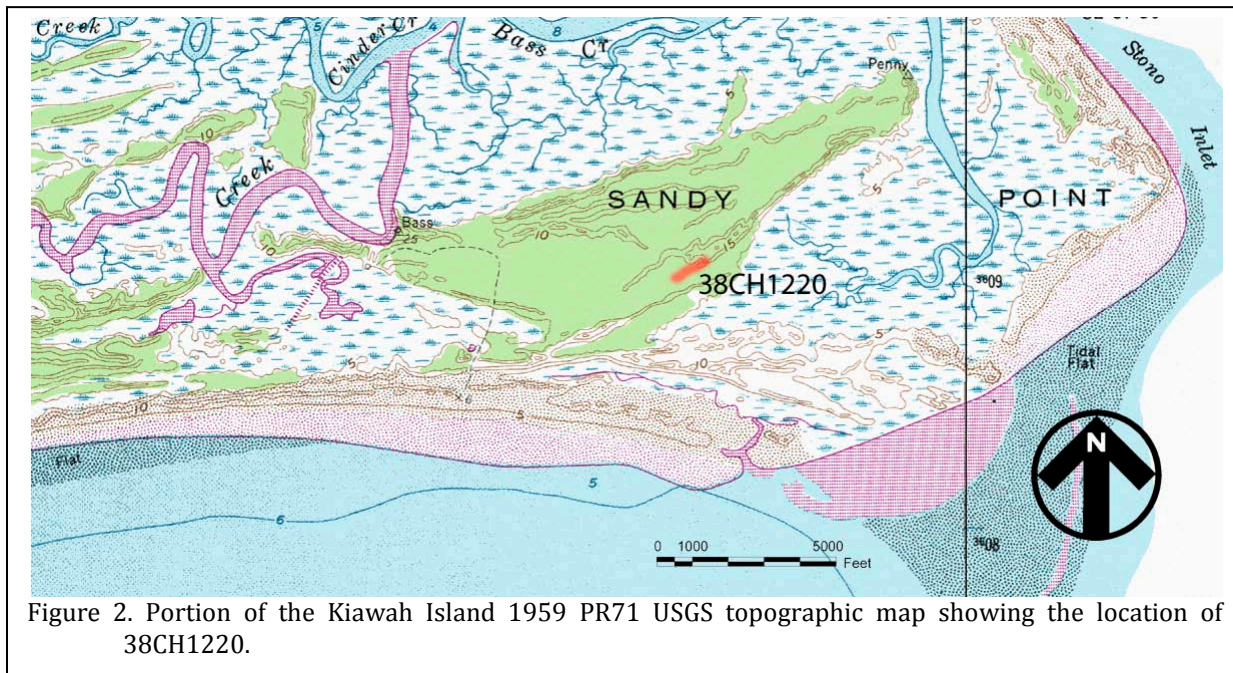


Figure 2. Portion of the Kiawah Island 1959 PR71 USGS topographic map showing the location of 38CH1220.

detector survey, take place to the north of the site boundaries. That work revealed no additional site evidence, finding the area to be low. Figure 1 reproduces the map of the site as it was thought to exist in 1991 and is based on the USGS topographic map.

As a result of the investigations in 1991, the site was interpreted to “represent a Civil War encampment.” We interpreted the brick scatters to be “kitchens,” with the tent camp located nearby. We also suggested that the site might represent an encampment of the 54th New York, although Jim Legg indicated that it was “unknown” to his informants and might also represent a camp of the 142nd New York. The site was recommended eligible for its data potential and this was concurred with by the SHPO.

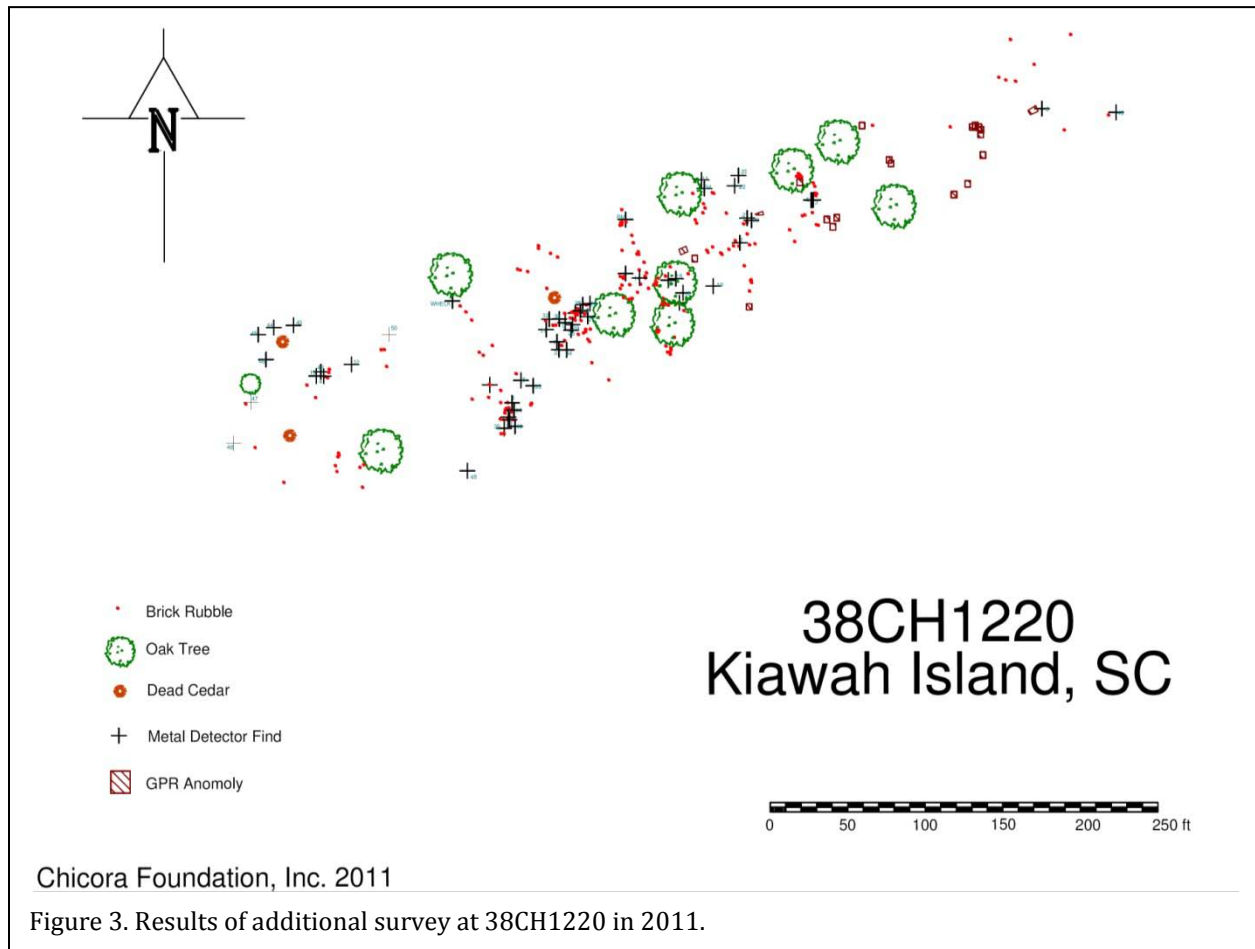
In spite of the eligibility recommendation, we noted that previous research on Civil War sites had failed to identify anthropological research questions of substance – a concern admitted by even those who had undertaken that research. We cautioned that research at 38CH1220 must “concentrate not only on the very real methodological issues (such as the use of metal detecting and other ground penetrating

non-destructive survey techniques), [but also] anthropological questions” (Trinkley 1993:139).

2011 Investigations

After 20 years it seemed appropriate to spend some minimal effort at 38CH1220 prior to developing a data recovery plan and beginning research. The first, critical, goal was to relocate the site after 20 years of topographic change. Without the use of GPS when the site was first encountered and no effort to accurately record the location through conventional survey techniques, this proved to be a challenge. The site was relocated, but it required considerable effort and was aided by the area having been traversed by survey crews in the preparation of development maps.

After the initial pedestrian survey to relocate the ridge on which the brick rubble was initially found, an updated SCIAA site form with new GPS points was filed in order that the site could be correctly identified. Boundaries of the site similar to those originally proposed (and based on surface finds, including brick rubble) were marked in the field to allow the dense woods to be opened up for a second phase of research.



The results of the relocation effort are shown in Figures 2 and 3. The site measured about 700 feet in length and about 100 feet in width. For the purposes of clearing, a 50-foot buffer was applied to the site so that an area measuring about 800 by 200 feet (about 3.5 acres) was available for additional study. While a buffer was included, we found that it was not generally a full 50 feet. We estimate that about 2.5 acres were available for the study.

This additional study involved three tasks. The first was to conduct a metal detector survey of the site. This consisted of pedestrian transects lengthwise across the site, spaced about every 25 feet, for a total of seven transects. Each transect was about 3 feet in width. This provided a small sample of the site, but we hoped would help determine the nature of metal artifacts in the

study area. Initially the survey was conducted in a mode that detects only non-ferrous remains. So few artifacts were identified that we switched to all-metal mode. A total of 50 discreet finds were recorded producing a total of 67 specimens. A few of these were clearly modern, such as a brass .50 caliber machine gun bullet. The bulk of the items, however, are likely associated with the site's occupation during the Civil War although military items (such as armament or insignia) are entirely absent (see Table 1).

The second task was the preparation of a map that identified the metal detector discoveries, as well as the individual brick fragments. The goal was to determine if the brick were tightly clustered or if discrete concentrations could be identified. This map is shown in Figure 3. Five brick clusters can be easily discerned, with

Table 1.
Artifacts Recovered from Metal Detecting

Number	Item	Description
1	Melted Lead	
2	3 Iron Axe Heads	
3	Iron square head post	30 1/2" x 1 3/4" (square head) x 1" (body)
4	UID Iron	17 1/2" x 1" diameter throughout
5	UID Iron	36" x 1 1/4" x 1/2"
6	2 Black glass bottle frags	one base
7	Black glass bottle base	
8	Black glass bottle base	
9	UID Iron	3" x 1 1/2"
10	UID Iron	42 1/2" x 1 1/2" x 1/2"
11	UID Iron	4" x 1"
12	Iron Stake	19" x 1" (diameter at head)
12	Iron stake?	21" x 1" x 1"
13	UID Iron	~ 1"
14	UID Iron	partial bottom to can
15	3 Iron frags (bucket handle)	
16	Iron stake/nail	6"
17	Iron post?	15" x 3/4"
18	UID brass	flat frag
19	Iron Nail	~7d (very corroded)
20	2 Iron strap frags	
21	Iron Nail	~16d
22	UID Iron (eye bolt?)	18" x 5" x 1"
23	UID Iron	14 3/4" x 1" diameter throughout
24	HW Nail	3d
25	2 UID iron	partial bottom to can
26	2 HW nail frags	
27	Strap frag	
28	Iron strap frag	
29	Strap frag	~11 1/2" x 1 1/2" x 1mm
30	Iron strap frag	
31	Iron nail/stake	6"
33	1 UID nail frag, 2 bone	
34	2 Iron strap frags	
37	Iron button and UID brass	
39	UID Iron (maybe broken stake)	10" x 1 1/2" (tapered)
40	HW Nail	~20d
41	Iron large nail or small stake	7"
42	HW Nail	~5d
43	Brass bullet	.50 caliber
44	UID Iron	11 1/2" x 1 1/2"
45	UID Iron	3" x 1" x 1"
46	UID Iron	4" x 1 1/2" (may be iron spall)
47	4 Iron strap frags	
48	Black glass bottle base	
49	4 Black glass bottle frags	(1 base, 1 neck, 2 body)
50	Iron strap?	29" x 1 1/2" x 1/4"

additional brick spreading out to the northeast and southwest (which might represent two additional dispersed concentrations). Artifacts from metal detecting are found primarily in the center and southwest, declining in frequency to the northeast.

The final task was the use of ground penetrating radar (GPR) and a magnetometer to see if clearly defined features might be recognized at the site. The work was conducted by GEL Geophysics of Charleston and they were briefed on the type of features that might be present prior to arrival on site. We were especially interested in wells and privies since both were aerially significant and deep. It was thought that such features might have a reasonably good chance of being found during a GPR and/or magnetometer survey. Of course, GPR can only identify anomalies – it cannot distinguish exactly what is being found and no ground truthing was incorporated in this phase of the work.

Figure 3 includes the anomalies. They are rather loosely scattered across the northeastern half of the site. While most are relatively small, three were encountered that were more rectangular and hold promise as perhaps being of archaeological significance. Table 1 identifies the recovered artifacts from this 2011 investigation.

Data Interpretations and Recognized Limitations

The historical research suggested that a typical regimental camp might be about 1,200 feet in length and about 1,500 feet in depth – or about 40 acres. 38CH1220 was thought to be about 800 feet in length and the brick rubble is suggestive of a series of kitchens stretching that distance. It seems reasonable, however, that perhaps 400 feet

of the site remains “lost” in the woods to the northeast and/or southwest. If the location of the kitchens is correct, then the officer’s privies (or sinks) would be about 640 feet, the enlisted tents would be about 60 feet in the opposite direction, and the enlisted privies would be about 600 feet (or about 480 feet beyond the tents).

Although we can’t be certain how the camp was oriented (i.e., officers to the north or south), we do know that within 150 feet to the south there are wetlands. To the north the elevation rises and then abruptly drops into a trough area about 260 feet to the north. This trough has, at some point in the past, been ditched.

Thus, the topography is not especially attractive for a military camp that required about 40 acres. While there is more space to the north, it seems unlikely that the officers would have taken the low ground more distant from the water breezes. If this bias is correct, then we may assume officers were located in the south, with the enlisted tents beginning about 50 feet to the north of the kitchens.

In a typical regimental camp, the distance from the kitchens to the enlisted tents was about 60 feet. If the enlisted were camped to the north of the 38CH1220 kitchen, then the proposed Cougar Island trail, situated about 100 feet to the north, may well prove to be on the south edge of the tent rows.

Regardless, it seems that the location would have required some compression or rearrangement of the typical camp pattern.

The most significant limitation of the data is that we have examined only perhaps 2.5 acres of a site that may be as large as 40 acres. Moreover, the 2.5 acres examined consists of a linear strip that likely represents only the kitchen area. Much more of the camp exists to the north and south (as well as perhaps to the east or west).

Research Questions

A fundamental question is whether camps such as 38CH1220 can address truly significant archaeological research questions. They presumably can produce considerable artifacts valued (both monetarily and aesthetically) by relic collectors. They may also be able to address issues of camp life, although there seems to be considerable historical documentation that deals with this specific topic (for example, books such as Wiley 1978 or the multitude of letters and other archival materials). Their true ability to make significant archaeological or anthropological contributions is not so clearly understood. Moreover, it is difficult to determine how much push to excavate such sites comes from the celebratory nature of the Sesquicentennial as opposed to legitimate scientific concern.

Given the apparent number of camps on Kiawah and the fact that 38CH1220 is likely the only one that will be studied, in the final analysis it was determined reasonable to anticipate some level of study at the site. At least three appropriate research questions can be identified at this juncture. The first has already been alluded to.

It appears that the camp location, identified as 38CH1220, is not ideal since it is neither of regulation size nor level. This suggests that some modifications in the camp layout may have been required. Thus, one question may be what the military believed was acceptable to modify and what provisions required rigid adherence?

This research question, however, can be addressed only if the boundaries of the entire camp can be identified. This will require considerable effort and it is uncertain how feasible the effort will be, given issues of vegetation (discussed below) and the ability to recognize all camp components. It will also require that the camp not have been repeatedly reoccupied since that may make it impossible to tease apart the different occupations.

INTRODUCTION

The second research goal involves the necessities of life that were brought to Kiawah in the context of camp life. Previous research in South Carolina has examined Hilton Head and Folly Island campsites. Both were used by the military over relatively long periods. This does not appear to be the case for the camps on Kiawah – although certainly a number of camps were established over a relatively short period of time. If the site was used multiple times, it may prove impossible to determine with certainty what regiment (much less what company) contributed trash to a specific feature. This may therefore require observations regarding camp life to be rather generic.

The third research question, albeit rather minor, involves how much of the Union military diet consisted of provisions that accompanied them to Kiawah (and might reasonably be expected to be salt beef or pork) and what was acquired locally, such as fresh fish, deer, small mammals, oysters, and local provisions of the forests and marshes.

Data Recovery Limitations

While there may be little agreement concerning the significant questions that sites such as 38CH1220 can address, there is little disagreement that the only way to get at whatever data these sites may possess is through massive stripping. When such stripping is done in pastures or open floodplain fields, the efforts are fairly straight forward. The topography is level and there is no highly valued vegetation.

The situation at 38CH1220 is very different. Topography varies from at least 4 to 11 feet AMSL. Examination of the topographic map reveals the complexity of the dune trough system in this area, made further complex by previous efforts to ditch and drain areas. In addition, within

the immediate site area there are 94 live oaks 10" dbh or larger. The largest is a 51" live oak.

Stripping a site such as 38CH1220 will, without question, have an impact on the health and well-being of these trees, especially since tree roots occur within the top 18 inches of soil – exactly the soil that would be removed in order to identify features. Every tree has a critical root

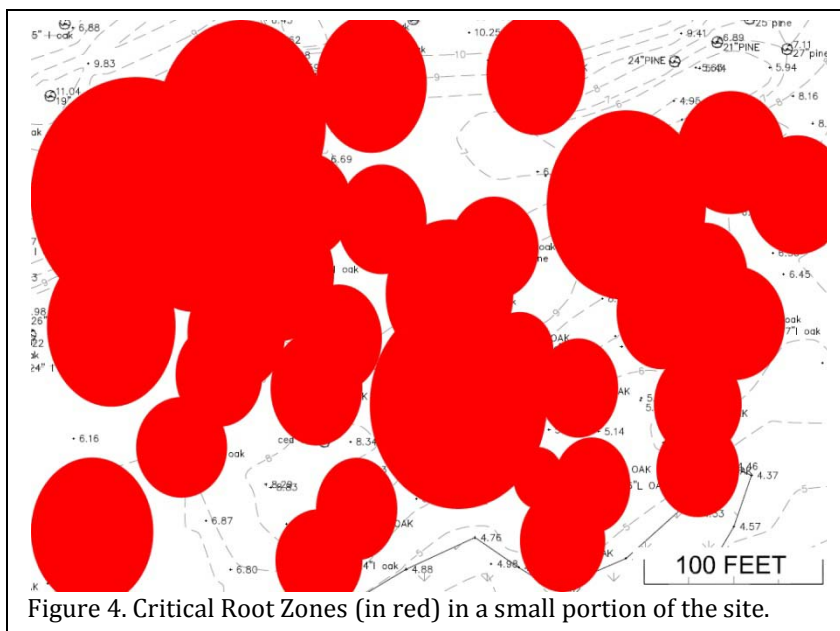
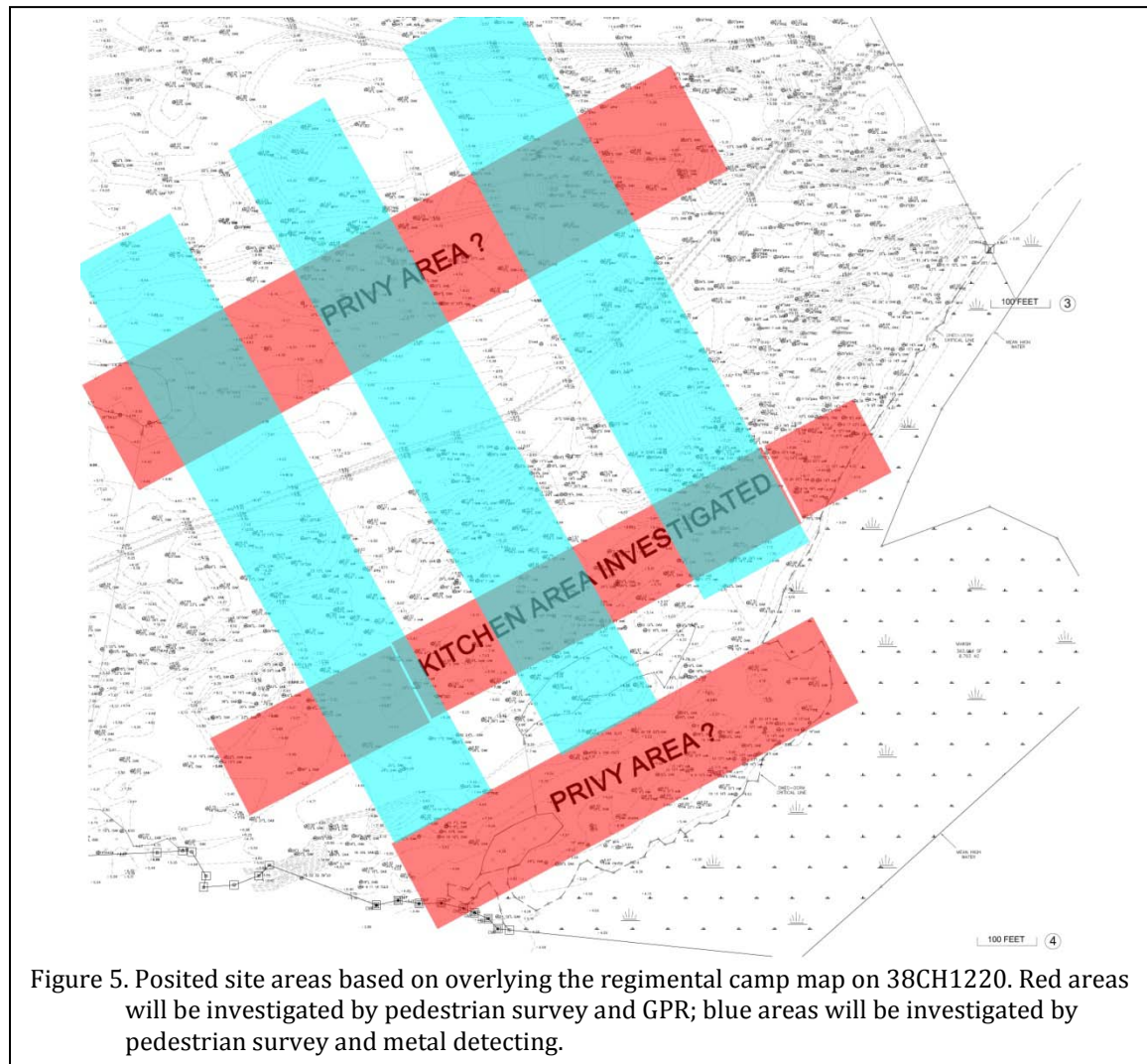


Figure 4. Critical Root Zones (in red) in a small portion of the site.

zone (CRZ). While this varies by species and site conditions, the International Society of Arboriculture (ISA) defines CRZ as an area equal to 1-foot radius from the base of the tree's trunk for each 1 inch of the tree's diameter at 4.5 feet above grade (referred to as diameter at breast height). Thus, the 51" dbh live oak has a CRZ of at least 51' (radius; 102' in diameter). The most common diameter live oak, 20", would have a CRZ diameter of 40 feet. These CRZ areas cannot be disturbed and also cannot have soil stockpiled on them.

Samnik (2000) provides mitigation values for lost or damaged trees, providing some specific examples using live oaks. For example, the mitigation cost of an 18" live oak is approximately \$2,900. The mitigation cost for a 37" live oak is nearly \$37,000. This document is incorporated in



the Florida Administrative Code and commonly used to evaluate tree losses in highway projects. It reveals that the loss of even a few of the trees on 38CH1220 would be a significant financial burden to the property owners. It also emphasizes the steps that must be taken to ensure that archaeological investigations do not damage the vegetation on the tract.

Figure 4 shows one portion of the known site area with the CRZ highlighted in red. This reveals that once the trees are protected there is very little area left for examination.

Simply put, 38CH1220 is not amenable to

mechanical stripping. Consequently we have focused on identifying alternatives to this approach. The most reasonable we believe is to use ground penetrating radar, perhaps supplemented with a magnetometer, in an effort to identify below grade features such as privies and wells. We admit that our initial effort in this regard was less than spectacular; nevertheless, we have identified no better approach.

We recognize that a 40 acre site is entirely too large to clear for geophysical exploration. A better approach is to identify those areas, such as the privies for enlisted and officers, where features may be reasonably anticipated.

In an effort to accomplish this we have used the model camp layout and overlaid it on the tree and topo map for the 38CH1220 site area to show the area of the kitchens previously investigated, additions to that area, the area of the privies or sinks to the north, and the only area where privies might be located to the south (prior to the marsh) (Figure 5).

This plan is speculative and assumes that the regimental camp layout was so well established that it can be used as a guide. It cannot address the problem that the site simply does not contain adequate ground to permit a normal layout to the south. Nor does it address features whose locations are not well defined, such as wells or specifically excavated trash pits.

It also fails to address the possibility that sea level changes over the past 150 years may have inundated areas that were originally drier and more useful for camp layout.

Data Recovery Plan

Phase 1 – Additional Research

As an initial step, we proposed conducting research at the National Archives in an effort to identify any additional records associated with Kiawah and its camps. Legg has already conducted much research and graciously shared this with us during the initial 1991 survey; it was unknown how much additional information might be identified. Nevertheless, previous researchers have wisely recommended such an effort after the difficulties encountered on Folly Island resulting from inadequate historic documentation.

Some effort was proposed to be directed toward examining regimental histories and other documents that may help shed light on activities taking place on Kiawah during the Civil War. Legg has again kindly provided extensive notes detailing what regiments are likely to have such histories, greatly aiding this effort.

Phase 2 – Field Investigations

The second phase of investigations was to be focused on the field investigations of the areas highlighted in Figure 5.

The first work to be required was the clearing of undergrowth and fallen timber to allow pedestrian survey, metal detecting, GPR, and magnetometer survey. Based on the SHPO recommendations, near surface metal detecting and pedestrian survey was to be undertaken in the blue areas running north-south. Magnetometer survey and GPR work was to be conducted in the red areas running east-west and thought to be most likely to produce features such as wells and privies. These areas were to also receive pedestrian survey. Examination of the map reveals that six areas were to receive GPR, magnetometer, and near surface metal detecting. The data recovery plan proposed that the near surface metal detecting would focus on only non-ferrous items.

We hoped that the metal detecting investigation would reveal large artifact clusters that might suggest the presence of features. The pedestrian survey was designed to identify brick concentrations that might help identify different site areas. The magnetometer survey, focusing on larger ferrous objects might reveal features into which large quantities of metal items had been deposited. Finally, we hoped the GPR work would identify square, rectangular, or circular features that might be consistent with privies or wells.

Any possible features were to be marked in the field and mapped. Features that could be excavated without damage to trees were to be identified and excavated. Entire features might be excavated or they might be cross sectioned only, based on artifact density, redundancy, and safe excavation requirements.

At the conclusion of stripping and archaeological excavations, the site was to be released to KRA Development for restoration and subsequent development.

Phase 3 - Analysis

Once the field investigations were

complete the artifacts would be returned to Columbia for laboratory processing. This would include washing, sorting, and cataloging. We proposed to use the SC Institute of Archaeology and Anthropology (SCIAA) for the curation of these remains and their cataloging system is therefore being used. The client has provided the curatorial facility with fee-simple ownership of the resulting collections.

Analysis of the collections would follow professionally accepted standards with a level of intensity suitable to the quantity and quality of the remains.

Curation

An updated site form reflecting this work has been filed with SCIAA. The field notes and artifacts from Chicora's data recovery at 38CH1220 will be curated at SCIAA. The artifacts have been cleaned and are currently in the process of being cataloged following that institution's provenience system. All original records and duplicate records will be provided to the curatorial facility on pH neutral, alkaline buffered paper. Photographic documentation is entirely digital. Copies of all photographs will be provided as tiff images to SCIAA.

INTRODUCTION

Investigations

Clearing

The first operation was to have a survey crew mark out the area to be investigated as agreed upon in the MOA with OCRM and the SHPO. This established an outer boundary for cleaning an area encompassing about 25 acres. A series of numbered stakes combined with white flagging was used to identify the limits of the area to be cleared.



Figure 6. Cleared and uncleared areas showing the dense vegetation that covered most of the site. The flagged stake is point 33 looking to the south.

The marked stakes were subsequently used to identify blocks, with each block defined by the stake in the southeast corner. Thus, the block delimited by stakes 2, 3, 4, and 5, was designated Block 5.

Clearing was conducted using a crew to

remove vegetation by hand, stacking the debris and then mulching the vegetation. Logs and debris too large for mulching were piled at the edges of the project limits. This process continued for several weeks and the work was inspected to determine if it was suitable for the proposed work. While the hand clearing was adequate for the pedestrian survey and for metal detecting in most areas, it was not sufficient to permit ground penetrating radar and magnetometer work. As a result, second firm was brought in with a skid

loader fitted with a bush hog in an effort to further open areas allowing for the geophysical work. In all, the crew conducting hand clearing spent about six weeks working in the 25 acres, while the crew operating the bush hog spent an additional three weeks.

We discovered it was impossible to fully operationalize the clearing plan since some portions of the proposed grid extended into delineated wetlands where clearing was not permitted. In the three weeks prior to this work, Kiawah received over 4 inches of rainfall.

An additional 4 inches of rain occurred during these investigations. As a result, many areas that might normally have been relatively dry exhibited standing water that precluded clearing and subsequent investigations.

While chipping vegetation seemed to be a reasonable approach and it would have been



Figure 7. Photo of dense chipped vegetation that prevented pedestrian survey in some areas.

extremely labor intensive to remove the very significant quantities, we found that mulching, even when spread, often blanketed the forest floor with 4 to 6 inches of mulch. This made pedestrian survey impossible and made metal detecting more difficult.

Operations at the site were also made



Figure 8. Example of a large wet area that precluded investigation.

more difficult by its inaccessibility. Vehicle access was not possible because of the dune and trough topography, coupled with the numerous drainage ditches. The construction of roads and bridges was not possible since OCRM had not issued a permit for such work. As a result, it was necessary to use 4x4 utility vehicles to move equipment and staff throughout the 25 acres. Mulching was accomplished using a PTO-powered chipper/shredder attached to a tractor.

Geophysical Investigations

Time-Domain Electromagnetic Methodology

The geophysical investigations were conducted by Mr. John Reynolds, a Geophysical Specialist with GEL Geophysics in Charleston, South Carolina. GEL investigated the three areas identified in Figure 5 using time domain electromagnetic method (TDEM) and ground penetrating radar (GPR).

The time-domain electromagnetic method measures the electrical conductivity of subsurface materials. The conductivity is determined by inducing (from a transmitter) a time or frequency-varying magnetic field and measuring (with a receiver) the amplitude and phase shift of an induced secondary magnetic field. The

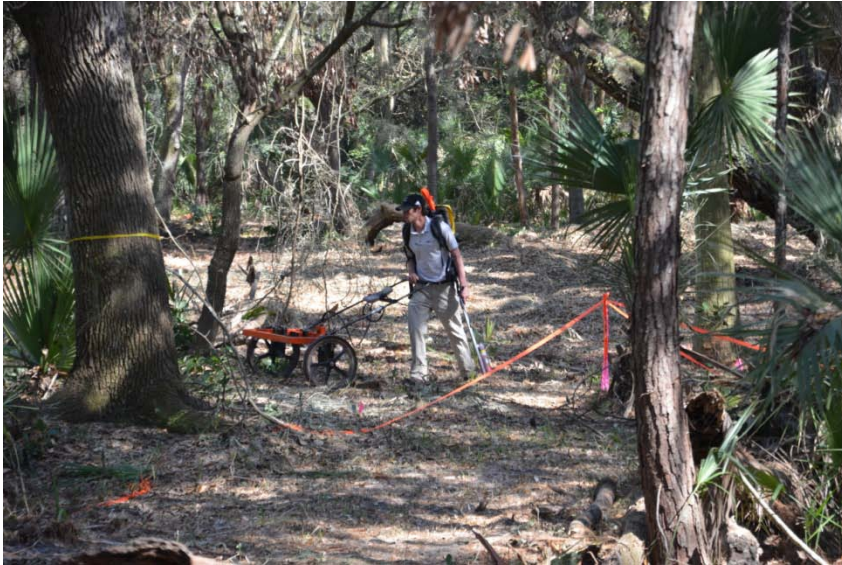


Figure 9. Photos of geophysical work. At the top is the Geonics EM-61. Below is the MALA Geosciences GPR system in use.

secondary magnetic field is created by subsurface conductive materials behaving as an inductor as the primary magnetic field is passed through them.

The Geonics EM-61 system used in this investigation operates within these principles. However, the EM-61 TDEM system can discriminate between moderately conductive

earth materials and very conductive metallic targets.

The EM-61 consists of a portable coincident loop time-domain transmitter and receiver with a 1.0-meter x 0.5-meter coil system. The EM-61 generates 150 pulses per second and measures the response from the ground after transmission or between pulses. The secondary EM responses from metallic targets are of longer duration than those created by conductive earth materials. By recording the later time EM arrivals, only the response from metallic targets is measured, rather than the field generated by the earth material.

The EM-61 data was collected with overlapping spacing between profiles, unless undergrowth or other physical features prevented access. Magnetic signatures were identified in the field and marked using paint and surveyor pin flags.

The goal of this work was to identify large masses of ferrous metal that might be associated with buried trash deposits, such

as filled wells or privies.

Ground Penetrating Radar Methodology

Ground penetrating radar (GPR) is an electromagnetic method that detects interfaces between subsurface materials with differing dielectric constants. The GPR system consists of

an antenna, which houses a transmitter and receiver; a profiling recorder, which processes the received signal and produces a graphic display of the data; a video display unit, which processes and transmits the GPR signal to a color video display; and a recording device.

The transmitter radiates repetitive short-duration EM signals into the earth from an antenna moving across the ground surface. Electromagnetic waves are reflected back to the receiver by interfaces between materials with differing dielectric constants. The intensity of the reflected signal is a function of the contrast in the dielectric constant at the interface, the conductivity of the material, which the wave is traveling through, and the frequency of the signal. Subsurface features that may cause such reflections include:

- natural geologic conditions such as changes in sediment composition, bedding and cementation horizons, voids, and water content, or
- man-introduced materials or changes to the subsurface such as soil backfill, buried debris, tanks, pipelines, and utilities.

For this work, the goal was to identify man-introduced changes – the existence of buried features such as rectangular or square privy pits, or circular wells.

The digital control unit processes the signal received from the antenna and produces a continuous cross section of the subsurface interface reflections, referred to as “reflectors” or “reflection events.”

Depth of investigation of the GPR signal is highly site specific, and is limited by signal attenuation (absorption) of the subsurface materials. Signal attenuation is dependent upon the electrical conductivity of the subsurface materials. Signal attenuation is greatest in materials with relatively high electrical conductivities such as clays and brackish groundwater, and lowest in relatively low

conductivity materials such as unsaturated sand or rock. In addition, the presence of reinforcement bar in concrete structures may severely attenuate the GPR signal such that objects below the slab may be undetectable. Depth of investigation is also dependent on antenna frequency and generally increases with decreasing frequency; however, the ability to identify smaller subsurface features is diminished with decreasing frequency.

GEL Geophysics uses GPR antennas that are internally shielded from aboveground interference sources. Accordingly, the GPR signal is not affected by nearby above ground conductive objects such as metal fences, overhead power lines, and vehicles. Therefore, no spurious reflection events are generated on the GPR data by above ground features, which could lead to false interpretation of subsurface anomalies.

The geophysical investigation was performed using a MALA Geosciences GPR system configured with a 250 MHz antenna array. The GPR data was collected with overlapping spacing between profiles, unless undergrowth or other physical features prevented access. The geophysical data was processed and interpreted in the field, and anomalies having the signature consistent with potential features were marked in the field using paint.

Results

GEL Geophysics identified 29 subsurface anomalies using TDEM that were consistent with near surface metallic objects. These were subsequently identified by Chicora and determined to be finds similar to near surface items being recovered using a metal detector. None represented features.

GEL Geophysics was unable to identify any subsurface anomalies using GPR technology that were consistent with trenching or shoring which may be indicative of former privies and/or wells targeted during this investigation.

Archaeological Investigations

Pedestrian Survey

The pedestrian survey involved walking the north-south and east-west transects at 25 foot intervals, using pin flags to identify brick fragments or any other surface remains. Specifically, other remains included evidence of looting, including masses of discarded artifacts and areas where still open metal detecting holes littered the landscape. In a few areas surface artifacts were also observed and they, too, were marked with pin flags.

Metal Detecting

Metal detecting used a Fisher F4 detector, initially set to discriminate against ferrous metals as stipulated in the proposal. The detector was swept along transects, avoiding areas of dense growth and wetlands. Each “hit” was flagged and at the conclusion of searching a block, work stopped and individual finds were excavated. Finds were sequentially numbered with the prefix

“MD” (Metal Detecting) and bagged. Occasionally other materials, such as glass, were recovered and they, too, were collected with the identified metal artifacts.

Work began in the north-south transects north of the ditch separating the site and our investigations found virtually nothing except .50 caliber machine gun bullets associated with the WWII troops stationed on Kiawah. These littered the study area and we quickly began to recognize their distinctive response. Only a small percentage were marked and subsequently recovered.

As we moved south of the ditch, we again noticed that the site was dominated by these WWII remains. As a result, we modified our research design to incorporate all metals. Opening up detecting to ferrous remains proved to be time consuming, but important. With the exception of several small lead puddles, all of the identified remains were ferrous. Metal detecting identified no brass or lead items typically associated with Civil War camps.

Archaeological Testing

Since the GPR and magnetometer failed to identify features for excavation, we chose two brick concentrations in different areas of the site for investigation. This work was not required by the data recovery plan.

In Block 17 a 5 by 10 foot unit (TU 1) was excavated on the south edge of a brick scatter. Level 1, between 0.35 and 0.7 foot in depth, consisted of a humic leaf zone about 0.1 foot, overlying a fine gray sand (7.5YR6/1). This level was found



Figure 10. Excavating metal detector finds.



Figure 11. Test excavations. At the top is TU 1, looking north. Below is TU 2, looking north.

to contain abundant brick and graded into a light yellowish brown (10YR6/4) fine sand.

While no features were found in TU 1, there were two shallow (0.3 to 0.4 foot in depth) post holes adjacent to one another. One was about 0.3 foot square; the other was slightly smaller and trapezoidal.

Artifacts from the unit included ginger beer bottle fragments, whiteware sherds, nails, and glass fragments. As mentioned, the unit also produced a large quantity of half and three-quarter brick fragments (no whole bricks were recovered). The total weight of recovered bricks was 317 pounds. Many of these bricks evidenced mortar, and mortar was found scattered throughout the unit. None of the bricks, however, were in situ.

TU 2, a 5 by 5 foot unit, was excavated at the edge of a brick scatter in Block 23. Level 1 exhibited a very thin (0.05 foot) humic zone overlying a very dark gray (7.5YR3/1) fine sand that was very damp. At the base was a gray (7.5YR5/1) sand. Level 1 varied from 0.45 to 0.7 foot in depth.

Brick were far less common in this unit, comprising only 68 pounds. Nevertheless, four partial bricks were found laid as a sailor course, perhaps to retain other, no longer surviving, bricks. Unfortunately, no other in situ bricks were recovered and the fragments at this unit were identical to those from TU 1 -

fragmentary and often exhibiting adhering mortar.

Artifacts included a small intact bottle, fragmentary wine bottles, and a variety of metal fragments, including one large stake.

Results

The pedestrian survey identified a variety of brick concentrations consisting of over 700 identifiable bricks. Virtually all of these were either half or three-quarter bricks, although a few whole bricks were found on the surface. Generally the surface bricks lacked evidence of mortar, probably the result of weathering and erosion.

While it seems likely that the bricks came from Kiawah, their size is not distinctive and we have no historical accounts of building demolition. It does seem possible, however, that either the Shoolbred or Vanderhorst plantation had piles of bricks for repairs or perhaps future construction. The prevalence of fragmentary bricks may also suggest residuals left from the construction of one or more of the brick structures on the island.

The pedestrian survey also recovered 31 metal artifacts. Several of these were found stacked in piles. Other materials were scattered across the surface of the site. All are likely materials discarded by looters as of no interest.

Near surface metal detecting identified 216 hits, recovering materials from each. The GEL magnetometer finds increase the total number of hits to 245.

The bulk of the objects



Figure 12. Parrott shell recovered from Block 41. Upper photo shows shell as recovered. Middle photo shows remnants of the zinc percussion fuze. Lower photo shows the shell being x-rayed.

identified by GEL were similar to those found during the near surface metal detecting. The one exception was an unexploded shell found in Block 41, north of the ditch bisecting the site. This item was identified by Chicora as we were excavating the GEL hits. The shell was found within 0.1 foot of the surface and is the only Civil War item identified north of the ditch.

appear to have been largely looted from the site.

The shell was intact, measuring about 6.4 inches in diameter and about 15.5 inches in length, including a brass sabot. The sabot served as the driving band for the projectile. It was attached directly to the iron shell and when fired, the expanding gases forced the sabot into the rifling grooves. This created the rotation of the shell, extending its range and improving its stability.

At the nose of the shell was evidence of zinc percussion fuze. This fuze, screwed into the nose of the shell, was designed to explode on contact.

This size shell, weighing about 80 pounds, would have been used in a 100-pound Naval Parrott. With a length of 138 inches, these guns weighed between 9,700 and 10,200 pounds and required a crew of 17 to fire. Using a charge of 10 pounds, the 80 pound shells had a range of about 7,800 yards (4.4 miles) at 30° and 6,900 yards (3.9 miles) at 25°. The flight time for these distances would have been about 32 seconds.

After being recorded, the Charleston County Sheriff's Department Bomb Squad was notified. They x-rayed the shell and subsequently notified the Air Force Unexploded Ordnance Squad, which collected the shell for disposal.

The archaeological testing revealed that while most of the brick scatters likely lack any in situ remains, at least some possess limited intact deposits. In the one location where intact deposits were identified, the brick appear to have been laid as a floor – probably for a tent. The archaeological work also suggests the presence of a variety of domestic artifacts, including various bottles, stoneware, and ceramics. Military items, however,

Summary

Historic Research

Full compliance with the Data Recovery Plan was achieved by Chicora conducting additional historic research at the National Archives. This work focused on documents relating to the Engineering Department, Signal Corps, and Quartermaster. The research failed to identify any significant new information and only occasional mentions of Kiawah were encountered in any of the records.

It appears from the sparse discussions of Kiawah that duty on the island was of little note and attracted no significant attention. A few comments do suggest that troops enjoyed Kiawah since it was more relaxed with less military formality. This may be of importance since it suggests less attention was paid to activities such as camp layout and camp policing.

Beyond the accepted plan, Chicora also explored the possibility that additional information may be present at the U.S. Army Military History Institute. They report having no information (including photographs) of any activities on Kiawah Island.

Ongoing is examination of histories for regiments known to have spent time on Kiawah. So far this work is consistent with the National Archives research. There are few mentions of Kiawah, suggesting that troops spent so little time on the island that it left no significant impression.

We are likewise examining available photographic archives of Union camp life on the sea islands, hoping to identify photographs that may help document, even indirectly, Kiawah activities. For example, we are focusing on photographs showing tents and camp

arrangements.

Additional research is being conducted as needed to interpret recovered remains, such as the Parrott shell previously discussed.

Clearing

Clearing was conducted in the manner stipulated by the Data Recovery Plan. There were, however, some unanticipated problems. Most significant was that dense rainfall, coupled with delineated wetlands, precluded all site areas from being cleared and made available for additional research. These inaccessible areas were added to the overall site map.

Had Kiawah not experienced a very wet Spring, it is probable that additional areas could have been cleared and made available for study. Nevertheless, this is an issue over which we had no control. Moreover, it is not entirely clear that Union troops might not have faced similar conditions.

In addition, the on-site chipping of vegetation made both pedestrian and geophysical investigations difficult in several areas. There was, however, no reasonable alternative to this approach given the isolated nature of the site and the inability to truck out debris.

It should be noted that in order to obtain conditions suitable for intensive pedestrian and geophysical exploration, great effort was spent in clearing approximately 25 acres. The effort required more time – and expense – than originally anticipated. This is an issue that should be carefully explored before undertaking a similar research design in the future.

Pedestrian Survey

The pedestrian survey covered the entire cleared area as stipulated by the Data Recovery Plan. This work produced a very broad scatter of bricks and identified considerable evidence of site looting. All bricks, surface finds, and looting evidence was flagged, with the data being incorporated and added to the overall site map.

Needless to say, without the extensive clearing effort much of these finds would have gone unrecorded.

Geophysical Prospecting

The geophysical prospecting exceeded the Data Recovery Plan. While it was proposed that near surface metal detecting would be conducted

for only non-ferrous items, an all-metal mode was used that significantly increased recovery.

In addition, Chicora expanded coverage to include seven entire blocks also examined by GEL, as well as partial coverage on several others.

All items identified by either GEL or Chicora were recovered and are being incorporated into analysis.

All of the geophysical tools performed as anticipated. Near surface metal detecting readily identified ferrous and non-ferrous remains, including both lead and brass. The most common non-ferrous artifacts identified included .50 caliber machine gun bullets, shell casings, and metallic links. These, of course, have no relevance to the proposed research and only a small sample

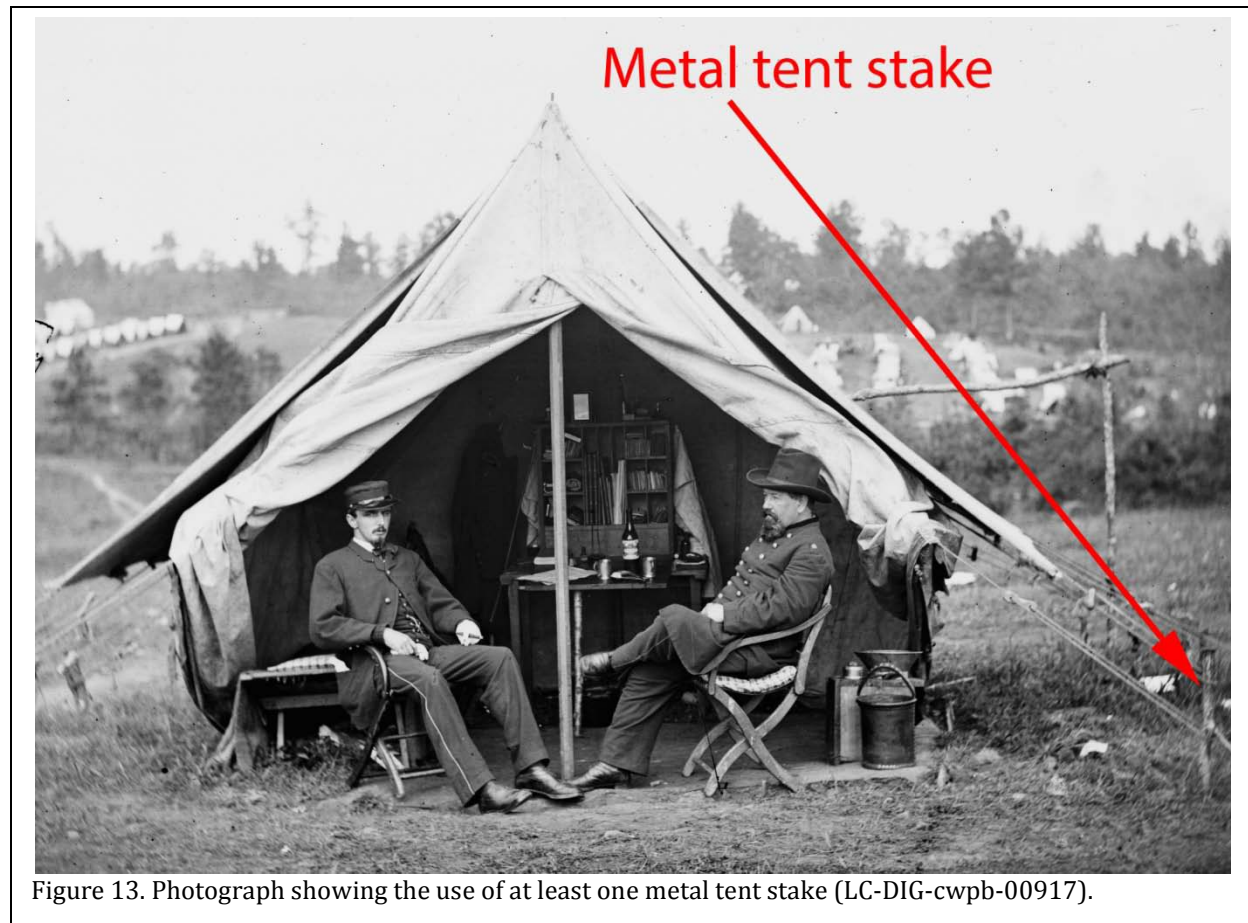


Figure 13. Photograph showing the use of at least one metal tent stake (LC-DIG-cwpb-00917).

were collected. The most common ferrous artifacts were iron rods ranging in diameter from about ½ to 1 inch and from a foot to several feet in length. While some of these are similar to picket pins used to secure horses, we believe that they were most likely used as tent stakes. Several period photographs have been found that appear to show similar rods being used for this purpose.

The magnetometer survey produced larger iron artifacts – primarily metal tent stakes – and failed to produce any evidence of camp features such as privies or wells.

While both feature types are documented at camps such as those on Folly and Hilton Head Islands (Legg and Smith 1989, Legg et al 1991), there is historical evidence that sinks or privies were not always used. Certainly wells would have been required on Kiawah and their failure to be found is difficult to interpret. Perhaps the features were too vague to be recognized by GPR and perhaps there was so little metal discarded in them that the magnetometer failed to identify them. Perhaps they were not located within the area being examined. Or perhaps both were located in the very low areas where no geophysical investigation was possible.

These investigations also failed to document the anticipated camp layout; although without features to orient the anticipated layout it is difficult to interpret the results. Certainly large quantities of bricks were recovered from the surface and these are thought to be associated, at least in part, with tent floors. Likewise a large number of metal rods were found and they, too, are thought to be associated with tents.

Looting

We know from Legg (personal communication 1991) that at least as early as 1990 this site was being looted by those using metal detectors. These current investigations reveal – based on the recovery of cans in looters' holes – that the looting continued to at least 2005. Many of the identified holes suggest that looting may have continued to at least 2010. Whether this

destruction was by island residents, their guests, or individuals boating into the site is not known. The extent of looting at this site is significant. It is clear that the site has been extensively looted and this may account for the absence of military paraphernalia.

During this investigation we found several areas where unwanted artifacts were found strewn around on the surface. One such location exhibited over 30 fragmentary wine bottles. In another location we identified a smaller assemblage of materials that had been dug out of some type of feature. In numerous additional areas we found metal detector holes, often with the turf still thrown aside and recognizable – suggesting that the holes date from the past few years. In one case we found a deep hole where the looter had attempted to remove an object, but was thwarted by tree roots. The hole was abandoned and left open.

Archaeological Excavations

The Data Recovery Plan called for excavation only of features identified through the geophysical prospecting. As no such features were identified, no further excavations were required. However, we did open two small test units to explore several brick piles.

When this site was used as a camp, it was wooded with a maritime forest, not dissimilar to what is present in the dune ridge and trough topography today (based on an 1854 map of the area). There is no evidence that the area was farmed or otherwise significantly altered in the postbellum or modern history of the island. Thus, these brick piles appear largely unaltered, except for whatever damage was caused by the military or subsequent looting.

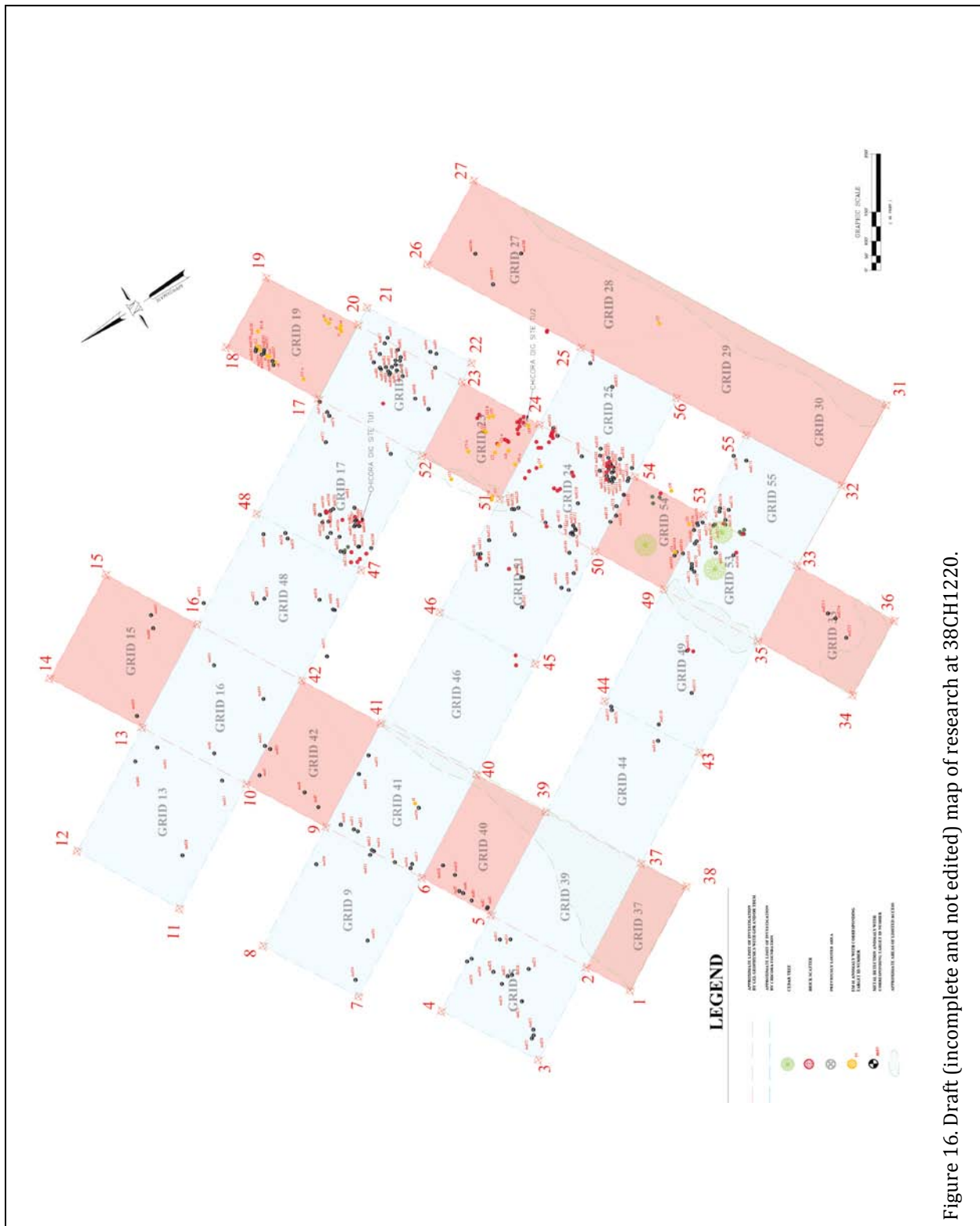
There was nothing in this research that suggested the brick were used for cooking fireplaces – which we had originally suggested. There was no ash or wood charcoal. We found virtually no bone or quantity of can metal in proximity to the brick piles. Based on very limited



Figure 14. Evidence of looting. The top photo shows a scatter of broken glass resulting from looting. Also present are sardine cans with a good-by-date of 2005. The lower photo shows distinct metal detecting holes and intact sod, likely from more recent looting.



Figure 15. Evidence of looting. The upper photo shows metal detecting hole and spoil. The lower photo shows a leaf filled hole, the sod, and scatter spoil.



evidence it appears that these brick may have represented tent flooring. Historic photographs reveal the use of wood (both lumber and logs), while historic research specific to Kiawah mentions the use of marble flooring found stacked at the Shoolbred house.

As mentioned, we cannot identify the source of the brick, but it appears to be consistent with that found at other historic sites on Kiawah and was likely scavenged.

Another important discovery is the quantity of ceramics, bottle glass, and stoneware present on the site. These remains are suggestive of lax military discipline, with much trash not making its way into trash pits.

The abundance of metal rods – which we interpret to be tent stakes – is also suggestive of relaxed military discipline. It seems that otherwise these would have been collected and removed as the troops left the island. It seems that it was easier to simply discard them on-site.

Conclusions

The investigations failed to achieve the goal of identifying a camp layout and permitting excavation of features. This may be the result of the geophysical methods not being sufficiently rigorous. It is, however, also possible that short-term camps are fundamentally different from long-term fortifications and encampments.

Pending additional investigations, we are inclined to believe that the nature of the Kiawah camp plays at least some role. This is based on the inability to identify any significant information concerning Kiawah in the various National Archives records or in reviewed regimental histories. What historical documents we have found suggest that soldiers relished the opportunity to get away from the strict camp discipline of Folly Island and this may indicate less than standard military behavior on Kiawah.

Even this seemingly negative information should have some impact on future research. We

certainly have a much clearer idea of how difficult Civil War research is when large areas of the site cannot be mechanically stripped. We also have at least some indication that there may be more diversity in military camps than previous South Carolina research would lead us to believe.

With the completion of the stipulated Data Recovery Plan we recommend that 38CH1220 be turned over to Kiawah Development Partners.

SUMMARY

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